Human Capital And Personal Factors As A Determinant Of Women Career Success In Engineering : A Proposed Model

Norazuwa Mat, Norsiah Mat, Siti Norezam Othman, Norlena Hasnan, Mohd Rizal Razalli, Husna Johari & Filzah Md Isa

College of Business
Universiti Utara Malaysia

Abstract

Women workforce in Malaysia has increased tremendously. These days, the roles of women are not only restricted to mothers and wives, but they also contribute significantly to the nation development in the labor market. The Malaysian Government has taken steps and actions to recognize women roles and contribution in the development of the country. Nevertheless, the increased participation of female in the workforce does not indicate the job or occupation they hold. Although there is an increment of female engineers in the workforce, their involvement is minimal. There is an existence of gender differences in the profession. Engineering field is perceived as masculine field such as tough, dirty, associate with machinery, which instigates and promoted occupational segregation. Hence, this research intends to explore some relevant issues of women's career in engineering and proposed a framework for it. This research will randomly select women engineers from all the states in Malaysia. The analysis techniques include descriptive statistics, correlations, hierarchical regression and etc. This research expects to provide some insights on the career development and advancement for women particularly in science and technology; and to provide inputs to policymakers in formulating policies.

Keywords*: Career success, Human capital, Personal factors, women*

INTRODUCTION

Women workforce in Malaysia has increased tremendously. These days, the roles of women are not only restricted to mothers and wives, but they also contribute significantly to the nation development in the labor market. A report in the year 2006 by the department of statistics of Malaysia shows that 3,656,800 or 36% of the workforce is women (Department of statistics Malaysia, 2006). Additionally, the number of registered women with the labor department has increased from 14,795 in 2003 to 52,829 in 2007 (Ministry of Human Resource Malaysia, 2006). That is equivalent to 257% increase in the number of registered women in the workforce. The Malaysian Government has taken steps and actions to recognize women roles and contribution in the development of the country. A National Policy for women is formulated in 1991 and in the process of implementing it. Women in Malaysia have made significant progress over the last 25 years. The percentages of women participation keep increasing from 44.7 percent in 2000 to 45.7 percent in 2005 as compared to 36 percent in the year of 1970. In fact, the female labor force, which used to be in the agriculture sector, has significantly moved to manufacturing and services industries (Ismail, 2007)

Nevertheless, the increased participation of female in the workforce does not indicate the job or occupation they hold (Yahya, 1993). The majority of new female jobs were clustered in the middle and lower income category job such as clerical staff, service and production workers, equipment operators and laborers. In terms of professional category, women are employed as doctor, dentist, lawyers, architects and engineers. The percentage in this category was 7.3 percent in 2000, increasing to 7.5 percent in 2005 (Malaysia, 2006). However, the large shares of female do not mean that they hold high rank post. With higher level of educational attainment, 2.3 percent of female were holding jobs as administrators and managers compared to 4.9 percent for the males in the same job category. Even though they have migrated from the traditional jobs such as in the agriculture based activity, more than 50 percent of executives and managerial posts held by male (Labor Force Survey, 2000) regardless of the sectors.

Considerable amount of research effort has been invested in the issue of women's career in engineering. Hackett and Betz (1981) study revealed that female college students were less prone to choose occupations

requiring physical science and technical background. This is primarily due to the substantially lower expectations of females regarding their own ability to perform the job duties. Other authors concur the findings such as Lent *et. al*, (1987); Schaefers *et al*. (1997) and Nauta *et al*. (1998). They highlight the link between strength of career-related self-efficacy expectations with the persistence in pursuing technical and scientific careers, and also the women's aspirations for top level positions in non-traditional career fields.

Women engineers encountered dilemma in the management style. If the women is an efficient and competent engineer, she is likely to be judged as "unfeminine" but if she demonstrated the female qualities of care and sensitivity, she is likely to be assessed as an inefficient or inappropriate engineers (Kanter, 1997; Marshall, 1984). Similarly, Etkowitz et al. (2000) argue that women face a series of gender related barriers to success in scientific careers. Some of their male contemporaries view female scientists as "honorary men", others see them as "flawed women" for attempting to participate in a traditionally male realm. The work of Maimunah (2003) is also important in this respect. From her case study, although all respondents admitted there is no difference in terms of performance between men and women engineers, still there are obvious boundaries on areas of specialization among the gender. Women engineers are more suitable for instrumentation, chemical, process and design engineering, and electrical and electronics engineering. Meanwhile, men are still dominating the mechanical, civil and automotive engineering.

PROBLEM STATEMENT

Although there is an increment of female engineers in the workforce, their involvement is minimal. There is an existence of gender differences in the field. Engineering field is perceived as masculine field such as tough, dirty, and to do with machinery, which instigates and promotes occupational segregation. This image impliedly produced the occupation segregation and perceived unsuitable profession for women. Furthermore, the prevailing culture and ethos of the industry appears to reinforce the masculinity of the industry (Powell *et al*., 2006). This has made this field unsuitable for female (Braybon and Summerfield, 1987). For this reason, women who entered engineering were seen as unusual and is negatively perceived by society, that this field is not fit for women.

Despite the perception from society, the government has encouraged more women to participate in the engineering field. Moreover, the field of engineering is dynamic. There is now less emphasis on heavy engineering and machinery and more focus on computers, mathematical models, printed circuit board and electronic. The field is changing from physically demanding career to a more mental capability requirement. The changes in the field require government as well as organization to act in such a way it reduces gender imbalances in the field. This reduction can be done by accommodating the needs of women engineers or streamlining the job requirement by not only tallying to the male needs but most importantly the women needs.

However, before formulating the programs that tailored to women in engineering that takes into consideration female workers perspectives, there are needs for us to explore the extent of women engineers attained their career benefits and the nature of career barriers faced by them. Even though women make up more than 36% of the labor force today, not many of them are in the technical fields such as the engineering field. Given the substantial contribution of these technical fields in our modern economy, the rapid expansion of employment opportunities and high wages in the engineering, the scarcity of women in these areas is still puzzling especially from an academic perspective. From a policy maker perspective it suggests that the nation's technical workforce may be failing to fully capture the creative energies that are potentially available among women. Around 70 percent of women who have science, engineering, and technology are not working in the sectors that use these skills. As a result, this contributes to the significant loss to the country's economy; the investment in training put forth by the government to educate female engineers, the inability of private organization to get qualified women to work with them and most importantly, the women lose out by not having well paid career in the sector (Pilch, 2006 p.6). This somehow caused women to experience direct and indirect, personal and professional barriers, which finally, hinder them from progressing in their careers. It was also found that subordinates who have a mentor have an advantage over other employees particularly in promotion (Lyness & Thompsn, 2000; Perrewe & Nelson, 2004; Wallace, 2001). A mentor can provide support, directions and feedback

regarding one's career development (Cohen et al., 2007; Goldshalk & Sosik, 2003, Greenhaus et al, 1990; Kram, 1983; Russell & Adams, 1997).

Dreher and Ash (1990), Bozionelos (2004) found that those who reported that they had received more mentoring were more likely to be successful in their careers. Therefore, it can be expected that having a mentor in the early stages of one's career or having mentor currently will have the positive effect on one's prospects for promotion, salary increase and job satisfaction.

OBJECTIVES

The objectives of the study are:

1. To examine the relationship between human capital factors and personal factors to women's career success.
2. To examine the moderating effect of mentoring in the relationship between human capital, personal factors and women's career success.

LITERATURE REVIEW

Career and career success

Arthur et al. (1989), a career is the evolving sequence of a person's work experience over time. An early definition of careers from the Oxford English Dictionary defines it as a person's course or progress through life (or distinct portion) and adds the qualifier especially when publicly conspicuous or abounding in remarkable incidents.Based on Judge et al.(1995), career success is identified as the positive psychological outcomes or achievements one has accumulated and a result of experiences over the span of working life. It consists of two main categories- objective and subjective career success (Aryee ety aal., 1994; Bretz and Judge, 1994; Judge et al., 1995).

Approaches to career success

A number of competing approaches have been identified to explain career success predictors. The three well-known approaches are the individual, the structural, and the behavioral perspectives (Rosenbaum, 1989; Aryee et al, 1994).

The first approach draws heavily on individual variables found in the popular literature of human capital and motivational theories (Ballout, 2007). The theory like Human Capital Theory suggests that individuals who invest the most in human capital attributes such as education, training, and experience are expected to show higher level of work performance and subsequently obtain higher organizational rewards. This approach focuses on the individual as the one who develops his/her own human capital and therefore maximizes his/her education and skill investments for achieving success in careers.

The second approach relies on the management theory of the firm and vacancy models and postulates that organizational factors such as organizational size and internal promotional practices are prerequisites for successful individual careers in organizations. (Ballout, 2007). The third approach assumes that career achievement is a function of certain career strategies including political influence behavior.

Antecedents of career success.

An examination of the literature on career success including demographic variables (Gattiker & Larwood, 1988), dispositional traits (Siebert et al, 1999), motivation (O'Reilly & Chatman, 1994), and political influence behaviors (Judge & Bretz, 1994), human capital attributes such as job tenure, cognitive ability and education have also been demonstrated to predict career success.

Human capital factors

First, early career research typically linked demographic and personal factors to career success. For example, demographic factors such as age and marital status and personal factors such as education and experience were found to be strong determinants of career success. (Dalton, 1951; Pfeffer, 1977; Hall, 1979; Gould and Penlety, 1984). More recently, empirical, evidence supports the idea that personal and socio-demographic characteristics are strong predictors of career success. (Ng et al., 2005; Kirchmeyer, 1998). Research evidence indicates that human capital variables have a significant impact on career success because they explain a large promotion of the variation in salary (Chenevert and Tremblay, 2002; Cannings, 1988; Jaskolla et al., 1985) as well as in the number of promotions (Stewart and Gudykunst, 1982). Researchers have found personal investments in educational and experience to be the strongest and most consistent predictors of career progression (Tharenou et al., 1994; Dreher and Ash, 1990). Interestingly, the study of Michie and Nelson (2006), also emphasize on the gender biases towards career orientation. Using IT as the focus of study, they claim since this field is dominated by men, people perceive lower confidence in the women's technical capabilities. These persistent and prevalent biases may discourage many talented women from entering the career field, and prevent those who choose to enter from advancing inside the organizations.

Personal factors

a. Personality

In recent years, researchers have acknowledged and documented the fact that we all have personalities (Golbergm, 1993) and personality matters because it predicts and explains behavior at work. Over the years, personality has had at best a good reputation as a predictor of work outcomes. Several theories accounts of how specific personality variables come to predict behaviors and outcomes of interest have been put forth and empirically tested. (Barrick, Mount, and Strauss (1933); Jugde & Bono, 2001; Judge, Bono Erez, Locke & Thoresen, 2002; Judge, Van, Vianen & De Pater, 2004). Some qualitative studies on women's advancement have reported that personality or perception of woman personality traits assist or derail their careers (Morrison et al., 19992; Seibert and Kraimer, 2001). One of the most compelling forms of evidence regarding the utility of personality is reported in the study by Judge, Higgins, Thoresen, and Barren (1999). The study was based on a unique longitudinal data set from the International Studies administered by the University of California at Berkeley. Results revealed that Five Personality traits predicted multiple facets of career success, whether assessed intrinsically (e.g. satisfaction) or extrinsically (e.g. occupational status), using either subjective reactions or objective indicators, over a span of 50 years or more.

Specifically, the results demonstrate that there are enduring relations between personality traits (e.g. consciousness and emotional stability assess in childhood, and career success assessed in late adulthood, with correlations ranging up to .49 (Judge et al., 1999). Further, these results showed that the Big Five traits as a group, explained significant incremental variance in measures of career success even after controlling for the influence of mentality ability. Thus, over a longtime, the cumulative benefits obtained through personality can be substantial at work. Thus, this present study assess if relationships exist between women's personality traits and their career development with respect to their engineering profession. This study may provide some important information in understanding the situation of females and to view how personality traits influence their career success in the engineering profession.

b. Motivation

According to the expectancy-valence theory of motivation (Vroom, 1964), people are motivated to put forth effort if they expect that the effort will lead to good performance and that the effort will be instrumental in attaining valued outcomes (Katzell & Thompson, 1990). Applied to work settings, expectancy-valence theory suggests that employees put forth more effort in performing their job tasks if they believe that the good performance will result in both intrinsic and extrinsic rewards. Past researchers have tested expectancy-valence theory by examining such variables as number of hours worked and work centrality to represent "effort" and expected salary and promotions to represent "desired outcomes". For example, Whitely et al. (1991) measured work motivation by three variables: average number of hours worked per week, expected future income, and work centrality. In their study, two of the motivational variables, average hours worked per week and expected future income were positively related to compensation. Another variable which may represent an employee's motivation is career planning. The

career planning model suggests that planning career goals leads to implementation of career goals which in turn, leads to attainment of career goals. A basic premise of the model is that career plans are a form of goal setting. Based on the psychological success model, goal setting leads to increased effort expenditure in order to attain the goals. Thus career planning should be followed by efforts to implement the plans or increased motivation. These efforts in turn lead to higher career performance and career involvement. Gould (1979) found that career planning was positively related to salary and career involvement. Aryee and Yaw (1993) and Wayne et al (1999) found further support for the career planning model. Yet, other studies define career motivation as motivation associated with a wide range of decisions and behaviors related to one's career. For example, London (1983), Day and Allen (2004) described career motivation as multidimensional, reflective of an individual's career identity, career insight, and career resilience. Career identity is the extent that one defines oneself by one's work. It is associated with job, organizational, and professional involvement, need for advancement, and recognition. Career insight is the ability to be realistic about one's career and consists of establishing clear, feasible career goals and realizing one's strengths and weaknesses. Career resilience is the ability to adapt to changing circumstances, even when circumstances are discouraging or disruptive. It consists of characteristics such as belief in self, willingness to take risks, and need for achievement.

To promote career motivation, employees should be given positive reinforcement for good performance, more opportunities for achievement and input, and receive support for skill development (London & Bray, 1984). Day and Allen (2004) found support that high career motivation may translate into higher performance level that leads to career success. Byrne et al. (2008) also found that those who are high in career motivation do indeed experience greater career success.

Mentoring

Research indicates that mentoring is positively related with proteges' career outcomes, such as increased job satisfaction, total incomes, and numbers of promotions (Allen et al., 2004). In general, mentors provide career related assistance that enhance proteges' job performance and prepare protégés for career advancement (Kram, 1995). Kram and Isabella (1995), O'Neill and Black-Beard (2002) identified two main functions of the mentoring relationship: career development and psycho-social support. In career development support, the mentor provides the protégé with exposure and visibility to others in the organization, challenging work, and protection. As part of psycho-social support, the mentor befriends the protégé, confirms the protégé's sense of self-worth, and counsels the protégé.

It was also found that subordinates who have a mentor have an advantage over other employees particularly in promotion (Lyness & Thompsn, 2000; Perrewe & Nelson, 2004; Wallace, 2001). A mentor can provide support, directions and feedback regarding one's career development (Cohen et al., 2007; Goldshalk & Sosik, 2003, Greenhaus et al, 1990; Kram, 1983; Russell & Adams, 1997).

Dreher and Ash (1990), Bozionelos (2004) found that those who reported that they had received more mentoring were more likely to be successful in their careers. Therefore, it can be expected that having a mentor in the early stages of one's career or having mentor currently will have the positive effect on one's prospects for promotion, salary increase and job satisfaction.Research indicates that mentoring is positively related with proteges' career outcomes, such as increased job satisfaction, total incomes, and numbers of promotions (Allen et al., 2004). In general, mentors provide career related assistance that enhance proteges' job performance and prepare protégés for career advancement (Kram, 1995). Kram and Isabella (1995), O'Neill and Black-Beard (2002) identified two main functions of the mentoring relationship: career development and psycho-social support. In career development support, the mentor provides the protégé with exposure and visibility to others in the organization, challenging work, and protection. As part of psycho-social support, the mentor befriends the protégé, confirms the protégé's sense of self-worth, and counsels the protégé.

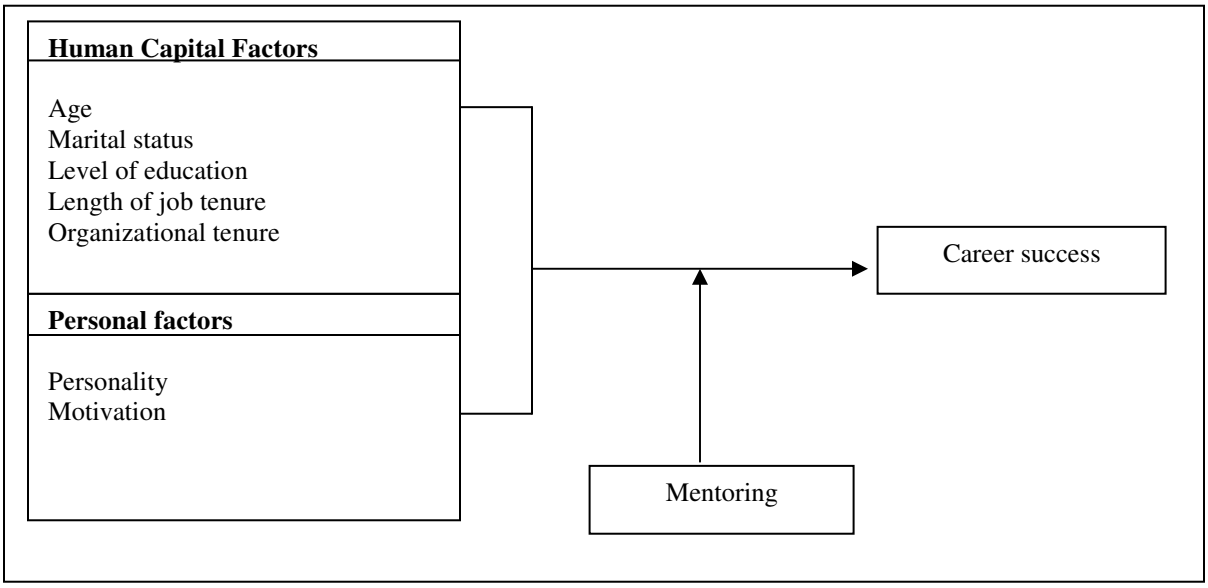

Figure 1: ***A proposed theoretical framework***

Based on the proposed theoretical framework, these hypotheses are formulated:

H1: Human capital factors have a significant relationship with career success
H2: Personal factors have a significant relationship with career success
H3: Mentoring will moderate the relationship between human capital factors and personal factors with career success

METHODOLOGY

This study will use survey method to test the hypotheses of the study. The population of this study included women engineers registered with the Institution of Engineers Malaysia (IEM). IEM is recognized as the main engineering organization in Malaysia that monitors all of its members. In 2008, it has 16, 789 members. Since the unit of analysis is at individual level, the respondents of the study will be women engineers. Moreover, this study will use the simple random sampling method in selecting respondents. This method was deemed appropriate because of small number of engineers available in each category of engineering discipline. A self-administered questionnaire will be used to collect data needed for the study. Before sending the mail questionnaires, a pilot test will be conducted through in depth interviews with women experts in the engineering field. This is to ensure the content validity of the measurements in the questionnaire. The feedback of the interviews will be used to revise the final questionnaire.

CONCLUDING REMARKS

Career in engineering can be considered gendered because of the imbalance of male and female in this field as well as their work styles, the symbols and images of engineering are gendered through cultural association such as associating engineering with masculinity and an individual engineer has gendered his or her personal and professional identities and experiences. Thus, a study to determine women engineer career success, by looking at the human capital, personal factors and mentoring in order to succeed in their career is significant. The better picture the authority has on women engineer in terms of their needs and requirement, the more support the authority could provide to them through policy development and implementation.

REFERENCES

Allen, T., Eby, L., Poteel, M., Lentz, E., & Lma, L. (2004). Career benefits associated wth mentoring for protégés: A meta-analysis. *Journal of Applied Psychology,* 89(1), 127-136.

Aryee, S., & Yaw, D.A. (1993). A cross-cultural application of a career planning model. *Journal of Organizational Behavior,* 13, 119-127.

Bagilhole, B. (1997), *Equal Opportunities and Social Policy: Issues of Gender, Race and Disability*, Longman, London.

Bierema,L.L. (2001). Women, working and learning. *New Directions for Adult and Continuing Education,* 92, 53-62.

Bochner, S., & Hesketh, B. (1994). Power distance, individualism/collectivism, and job-related attitudes in a culturally diverse work group. *Journal of Cross-Cultural Psychology,* 25, 233-257.

Byrne, Z.S., Dik, B.J., & Chiaburu, D.S. (2008). Alternatives to traditional mentoring in fostering career success. *Journal of Vocational Behavior,* 72, 429-442.

Chatman, J.A. (1991). Matching people and organizations: Selection and socialization in public accounting firms. *Administrative Science Quarterly,* 36, 459-484.

Clugston, M., Howell, J., & Dorfman, P. (2000). "Does cultural socialization predict multiple bases dan foci for commitment?".*Journal of Management*, 26, 5-30.

Day, R., & Allen, T.M. (2004). The relationship between career motivation and self-efficacy with protégé career success. *Journal of Vocational Behavior,* 64, 72-91.

Delany, L. (2003). Escape from corporate America. *Across the Board,* March/April, 39-43.

Department of Statistics (2000). Labor Force Survey Report, Kuala Lumpur

Department of statistics Malaysia. (2006). *Perangkaan tenaga buruh Malaysia*. Retrieved May 12, 2008, from http://www.statistics.gov.my

Erdogan, B., Kraimer, M.L., & Liden, R.C. (2004). Work value congruence and intrinsic career success: The compensatory role of leader-member exchange and perceived organizational support. *Personnel Psychology,* 57, 305-332.

Etkowitz, H., Kemelgor, C., and Uzi, B. (2000), *Athena Unbound: The advancement of Women in Science and* Technology, Cambridge University Press, Cambridge.

Evett, J. (1997). "Women and careers in engineering: management changes in the work organization", *Women in Management Review*, Vol. 12, No. 6, pp. 228-233.

Evetts, J. (1998). "Managing the technology but not the organization: women and career in engineering". *Women in Management Review*, Vol. 13, No. 8, pp. 283-290.

Fletcher, J.K., Jordan, J.V., & Miller, J.B. (2000). Women and the workplace: Applications of a psychodynamic theory. *American Journal of Psychoanalysis,* 60, 243-261.

Gabor, A. (1994). "*Cracking the glass ceiling in R&D*" Research Technology Management, Vol. 37, No. 5, pp. 14-20.

Godshalk, V.M., & Sosik, J.J. (2003). Aiming for career success: The role of learning goal orientation in mentoring relationships. *Journal of Vocational Behavior,* 63, 417-437.

Gosling, S.D., Rentfrow, P.J., & Swann, W.B. Jr. (2003). A brief measure of the big-five personality domains. *Journal of Research in Personality,* 37, 504-528.

Gould, S. (1979). Characteristics of career planners in upwardly mobile occupations. *Academy of Management Journal,* 22, 539-550.

Greenhaus, J., Parasuraman, S., & Wormley, W. (1990). Effects of race on organizational experiences , job performance evaluations, and career outcomes. *Academy of Management Journal,*33(1), 64-86.

Hackett, G and Betz, N.E (1981), "A self-efficacy approach to the career development of women", *Journal of Vocational Behaviour*, Vol. 18, pp. 326 -39.

Hassan, I.B. (2007). Career Success: The effects of human capital, person-environment fit and organizational support. *Journal of Managerial Psychology, 22(8), 741-765.*

Henwood, F. (1998). "Engineering difference discourses on gender, sexuality and work in a college of technology", *Gender and Edication*, Vol. 10, No. 1, pp. 35-49.

Institution of Engineers Malaysia. (2008). *Laporan Tahunan ke 49 - Sesi 2007/2008*. Retrieved May 15, 2008, from http://www.iem.org.my

Ismail, M and Ibrahim, M (2008). "Barriers to Career Progression faced by Women: Evidence from a Malaysian Multinational oil company", Gender in Management: An International Journal, Vol.23#1, 51-66

Jandeska, K.E., & Kraimer, M.L. (2005). Women's perception of rganizational culture, work attitudes, and role-modeling behaviors. *Journal of Managerial Issues*, XVII,4, 461-478.

Kanter, R.M (1971). *Men and Women of the Corporation*, Basil Books, New York, NY.

Katzell, R.A., & Thompson, D.E. (1990). Work motivation: Theory and practice. *American Psychologist,* 45, 144-153.

Lent, R. W., Brown, S.D. and Larkin, K.C (1987), "Comparison of three theoretically derived variables in predicting career and academic behaviour: self efficacy, interest congruence, and consequence thinking", *Journal of Counselling Psychology*, Vol. 34, No. 3, pp. 293-8.

London, M. (1983). Toward a theory of career motivation. *Academy of Management Review,* 8, 620-630.

London, M., & Stumpf, S.A. (1982). *Managing careers*. Reading, MA: Addison-Wesley.

Maimunah, Ismail. (2003). "Men and women engineers in a large organization: progression based on subjective-career experience" *Women in Management Review*, Vol. 18. No.1/2,pp. 60 -67.

Malaysia (2006). Ninth Malaysia Plan, 2006-2010. Government printing of Malaysia, Kuala Lumpur

Mann, S. (1995). Politics and power in organization: Why women lose out. *Leadership and Organizational Development Journal*, 16, 9-15.

Marshall, J (1984). *Women Managers*, Wiley, Chichester.

Mc Rae, S., Devine, F., and Lakey, J (1991), *Women into Science and Engineering*, Policy Studies Institute, London.

Meyerson, D., & Flectcher, J.K. (2000). A modest manifesto for shattering the glass ceiling. *Harvard Business Review,* 78, 126-136.

Michie, S., and Nelson, D.L. (2006), "Barriers women face in information technology careers: Self-eficacy, passion and gender biases", *Women in Management Review,* Vol. 21 No. 1, pp. 10-27.

Ministry of Human Resource Malaysia. (2005). *Perkhidmatan professional*. Retrieved May 12, 2008, from http://www.mohr.gov.my

Ministry of Human Resource Malaysia. (2006). *Statistik perburuhan dan sumber manusia*. Retrieved May 15, 2008, from http://www.mohr.gov.my

Nauta, M.M., Epperson, D.L. and Kahn, J.H. (1998), "A multiple-groups analysis of predictors of higher level career aspirations among women in mathematics, science and engineering majors", *Journal of Counseling Psychology*, Vol. 45, pp. 483-96.

Pilch, T. (2006). "Diversity and the Economy", The Smith Institute, London, Diversity and Equality available at www.smith-institute.org.uk/pdfs/divery.pdf (accessed 16th May, 2008)

Powell, A., Bagilhole, B.M and Dainty, A. (2006). "The problem of women's assimiliation into UK engineering cultures: can critical mass work?" *Equal Opportunities International,* Vol. 25, No. 8., pp. 688 -699.

Powell, G., (2000), "The glass ceiling: explaining the good and bad news", in Davidson, M and Burke, R. (Eds), *Women in Management Review: Current Research Issues*, Sage, London.

Robert, C., & Wasti, S.A. (2002). Organizational individualism and collectivism: Theoretical development and an empirical test of a measure. *Journal of Management,* 28, 544-566.

Rosenbloom, J. L., Ash, R. A., Dupont, B., & Coder, L. (2007). Why are there so few women in information technology? Assessing the role of personality in career choices. *Journal of Economic Psychology, In Press, Corrected Proof.*

Sagebiel, F.(2003), "New Initiatives in Science and Technology and Mathematics at the formal level: Masculinity Cultures in Engineering departments in institutions of higher education and perspectives for social change", GASAT II Gender, Science Technology, and Economic Paradigm Shift, 6-11July

Schaefers, K.G., Epperson, D.L. and Nauta, M.M. (1997), "Women's career development: can theoretically derived variables predict persistence in engineering majors?", *Journal of Counseling Psychology*, Vol. 44, pp. 173-83.

Schein,E.H. (1992). *Organizational culture and leadership*. San Francisco, CA: Jossey-Bass.

Triandis, H.C. (1995). *Individualism and collectivism*. Boulder, CO: Westview Press.

Von Vianen, A.E.M., & Fischer, A.H. (2002). Illuminating the glass ceiling: The role of organizational culture preferences. *Journal of Occupational & Organizational Psychology,* 315-337.

Vroom, V.H. (1964). *Work and Motivation*. New York: John Wiley.

Wayne, S.J., & Ferris, G.R. (1990). Influence tactics, affect, and exchange quality in supervisor-subordinate interactions: A laboratory experiment and field study. *Journal of Applied Psychology,* 75, 487-499.

Wayne, S.J., Liden, R.C., Kraimer, M.L., & Graf, I.K. (1999). The role of human capital, motivation, and supervisor sponsorship in predicting career success. *Journal of Organizational Behavior,* 20(5), 577-595.

Whitely, W., Dougherty, T.W., & Dreher, G.F. (1991). Relationship of career mentoring and socioeconomic origin to managers' and professionals' early career progress. *Academy of Management Journal,* 34, 331-351.

Yahya, S.R (1991), "Patterns and trends of labor force participation of women", Paper submitted to HAWA, under the "Women and Development Program" project, Kuala Lumpur